

U.S. Serial No. 09/611,521 (Attorney Dkt: LIDO:003)  
Art Unit: 1711

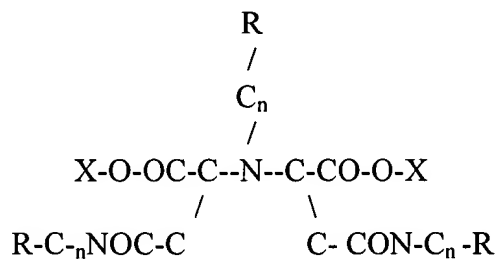
**IN THE CLAIMS:**

Please amend claims 1, 6, 8-11, 15, 19, 23, and 27 to read as follows:

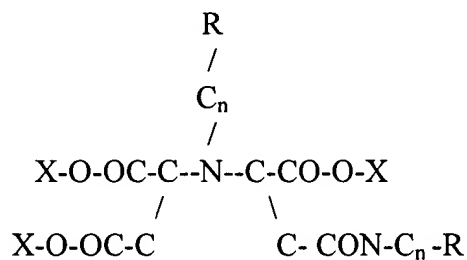
**I CLAIM:**

1. (Currently Three Times Amended) A chelating composition comprising a modified iminodisuccinic acid, or a salt thereof, having the ability to donate at least five nonbonded pairs of electrons without hindrance or bond strain, and having one or more of the following formulas:

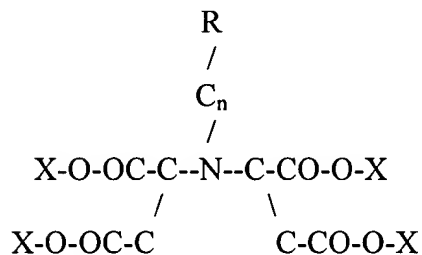
(a)



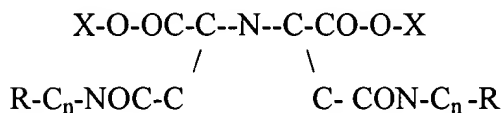
(b)



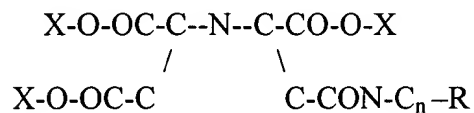
(c)



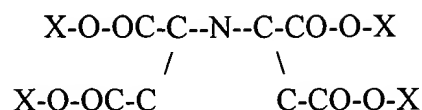
(d)



(e)



(f)



where X is H, alkali, alkaline earth, ammonium-substituted radical, ammonium or transition metal;

where n is 1 to 10; and

where R is a Lewis base capable of donating a nonbonded pair of electrons, and wherein said composition is synthesized in a single vessel, at ambient pressure, without the addition of heat, whereunder a primary or secondary amide reaction occurs first followed by a radical reaction.

2. (Withdrawn) ~~The chelating composition of claim 1 in combination with fertilizer or fertilizer additives.~~
3. (Withdrawn) ~~A fertilizer comprising the chelating composition of claim 1 for application to soils, seeds or plants.~~
4. (Withdrawn) ~~The fertilizer of claim 3 wherein said fertilizer is a non-phosphate fertilizer.~~
5. (Withdrawn) ~~The fertilizer of claim 3 wherein said fertilizer is a phosphorus containing fertilizer.~~

6. (Currently Twice Amended) A method for making a modified iminodisuccinic acid having the ability to donate at least five nonbonded pairs of electrons without hindrance or bond strain, said method comprising:

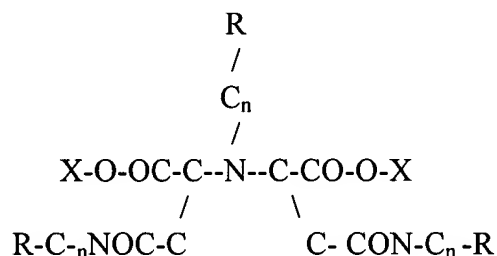
mixing together an acid anhydride or lactone with a ~~first polyfunctional amine~~ monoethanolamine and allowing said mixture to react to form an amide;

adding to said amide a ~~second~~ polyfunctional amine, maleic anhydride or acid salt, and water and allowing said mixture to react in said water to form said modified iminodisuccinic acid, and

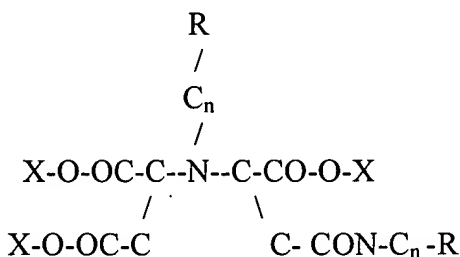
wherein said synthesis occurs in a single vessel, at ambient pressure, and without the addition of heat.

7. (Previously Amended) The method of claim 6 wherein said modified iminodisuccinic acid has one of the following formulas:

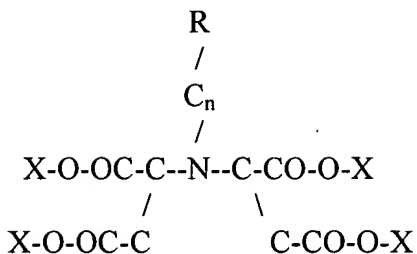
(a)



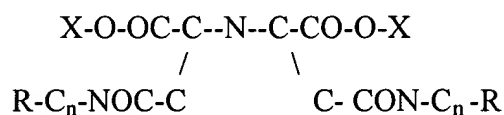
(b)



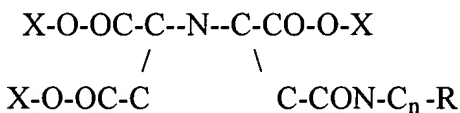
(c)



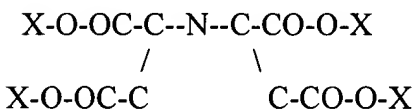
(d)



(e)



(f)



where X is H, alkali, alkaline earth, ammonium-substituted radical, ammonium or transition metal;

where n is 1 to 10; and

where R is a Lewis base capable of donating a nonbonded pair of electrons.

8. (Currently Twice Amended) ~~The method of claim 6~~ A method for making a modified iminodisuccinic acid comprised of 2, 2-amino N,N-diethanolsuccinic amide having the ability to donate at least five nonbonded pairs of electrons without hindrance or bond strain, said method comprising:

~~\_\_\_\_\_ mixing together wherein said anhydride is~~ maleic anhydride ~~with and said first~~  
~~polyfunctional amine is~~ ethanol amine;

~~\_\_\_\_\_ and allowing said mixture to react to form an amide;~~

~~adding to said amide and said second polyfunctional amine is~~  $\text{NH}_3$ , and water  
~~and allowing said mixture to react in said water to form and said modified~~  
~~iminodisuccinic acid is comprised of 2,2-amino N,N-diethanol succinic amide, and~~  
~~wherein said synthesis occurs in a single vessel, at ambient pressure, and without~~  
~~the addition of heat.~~

9. (Currently Amended) ~~The method of claim 6 where,~~ A method for making a  
modified iminodisuccinic acid having the ability to donate at least five nonbonded pairs  
of electrons without hindrance or bond strain, said method comprising:

~~\_\_\_\_\_ mixing together an acid anhydride or lactone with monoethanolamine~~

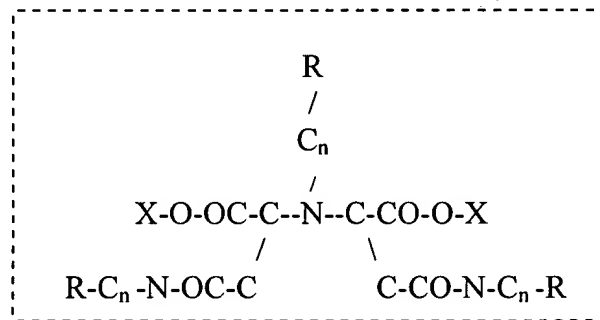
~~\_\_\_\_\_ and allowing said mixture to react to form an amide;~~

~~instead of adding to the amide a second polyfunctional amine~~ adding to said  
amide an acid anhydride and  $\text{Me}(\text{OH})$  alkali metal hydroxide and  $\text{R-NH}_2$ , where  
R is hydroxyl, ~~is added to the amide~~ and water and ~~allowed to react to form~~  
allowing said mixture to react in said water to form an amino acid ~~Me~~ alkali metal  
salt of the amide, which in said water will become a modified iminodisuccinic  
acid, and

wherein said synthesis occurs in a single vessel, at ambient pressure, and without  
the addition of heat.

10. (Currently Amended) The method of claim 6 wherein said anhydride or lactone is selected from the group consisting of: maleic anhydride; and said ~~first and second~~ polyfunctional amines ~~are~~ is selected from the group ~~consisting~~ of difunctional amines ~~selected from the group~~ consisting of organic diamines, hydroxylamines, polyamines, poly hydroxylamines, acid amines, and mixtures thereof.

11. (Currently Three Times Amended ) The synthesis of compounds comprising at least one poly functional substitution on iminodisuccinic acid having the following formula and the ability to donate at least five nonbonded pairs of electrons without hindrance or bond strain:



where X is H, alkali, alkaline earth, ammonium-substituted radical, ammonium or transition metal; n is 1 to 10, and R is a Lewis base capable of donating a nonbonded pair of electrons, wherein said synthesis comprises the steps of:

- (a) adding an acid anhydride or lactone to a ~~first polyfunctional amine~~ monoethanolamine, and allowing same to react to form a N-polyfunctional acid common name amide; and
- (b) adding water, ~~Me(OH)~~ alkali metal hydroxide, and a ~~second~~ polyfunctional amine to said N- polyfunctional acid common name amide and

allowing same to react to form an imino di N- polyfunctional acid common name  
amide, and

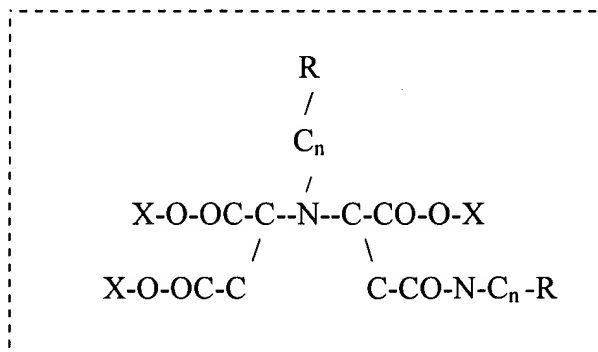
wherein said synthesis occurs in a single vessel, at ambient pressure, and without the  
addition of heat.

12. (Withdrawn) ~~The compounds synthesized in claim 11 used as fertilizer additives.~~

13. (Withdrawn) ~~The compounds synthesized in claim 11 used as chelating agents in  
concentrations of  $1/10^a$  to 1 part, where a is less than 10, or  $1.0 \times 10^{-9}$  Molar to 3  
Molar.~~

14. (Withdrawn) ~~The compounds in claim 11 used for application to soils, seed, or  
plants.~~

15. (Currently Three Times Amended) The synthesis of compounds comprising at least  
one poly functional substitution on iminodisuccinic acid having the following  
formula and the ability to donate at least five nonbonded pairs of electrons without  
hindrance or bond strain:





where X is H, alkali, alkaline earth, ammonium-substituted radical, ammonium or transition metal salts, n is 1 to 10, and R is a Lewis base capable of donating a nonbonded pair of electrons, ~~and Me is selected from the alkali metals,~~ wherein said synthesis comprises the steps of:

(a) adding an acid anhydride or lactone to ~~a first polyfunctional amine monoethanolamine~~, and allowing same to react to form a N- polyfunctional acid common name amide; and

(b) adding to said N- polyfunctional acid common name amide, water, a ~~second~~ polyfunctional amine, an acid anhydride or lactone, a ~~Me (OH)~~ alkali metal hydroxide, and allowing same to react to form said compounds, and

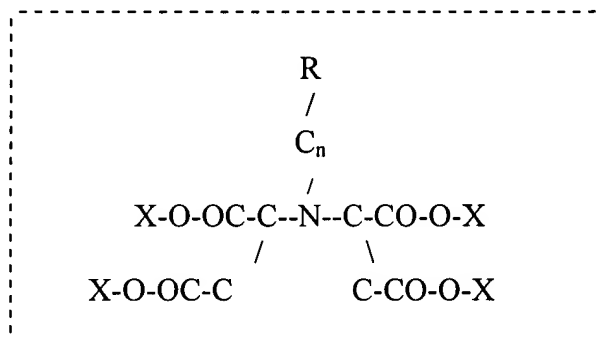
wherein said synthesis occurs in a single vessel, at ambient pressure, and without the addition of heat.

16. (Withdrawn) ~~The compounds synthesized in claim 15 used as fertilizer additives.~~

17. (Withdrawn) ~~The compounds synthesized in claim 15 used as chelating agents in concentrations of  $1/10^a$  to 1 part, where  $a$  is less than 10, or  $1.0 \times 10^{-9}$  Molar to 3 Molar.~~

18. (Withdrawn) ~~The compounds in claim 15 used for application to soils, seed, or plants.~~

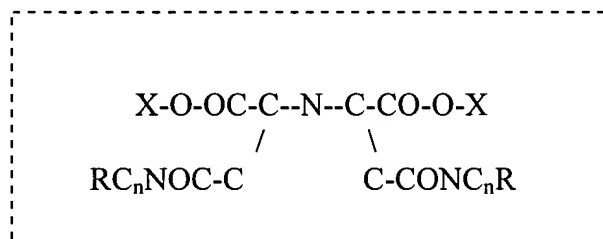
19. (Currently Three Times Amended) The synthesis of compounds comprising at least one poly functional substitution on iminodisuccinic acid having the following formula and the ability to donate at least five nonbonded pairs of electrons without hindrance or bond strain:



where X is H, alkali, alkaline earth, ammonium-substituted radical, ammonium or transition metal salts, where n is 1 to 10; where R is a Lewis base capable of donating a nonbonded pair of electrons, wherein said synthesis comprises the steps of: adding maleic anhydride or malic acid to ~~Me(OH)~~ alkali metal hydroxide + ~~polyfunctional amine~~ monoethanolamine + water, and allowing same to react to form the N, N-disuccinamicamino(:functional group), and wherein said synthesis occurs in a single vessel, at ambient pressure, and without the addition of heat.

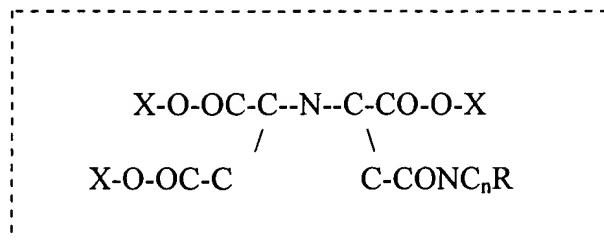
20. (Withdrawn) ~~The compounds synthesized in claim 19 used as fertilizer additives.~~

21. (Withdrawn) ~~The compounds synthesized in claim 19 used as chelating agents in concentrations of  $1/10^a$  to 1 part, where a is less than 10, or, or  $1.0 \times 10^{-9}$  Molar to 3 Molar.~~
22. (Withdrawn) ~~The compounds in claim 19 used for application to soils, seed, or plants.~~
23. (Currently Twice Amended) The synthesis of compounds comprising at least one poly functional substitution on iminodisuccinic acid having the following formula and the ability to donate at least five nonbonded pairs of electrons without hindrance or bond strain:



where X is H, alkali, alkaline earth, ammonium-substituted radical, ammonium or transition metal salts; where n is 1 to 10, where R is a Lewis base capable of donating a nonbonded pair of electrons; wherein said synthesis comprises the steps of :

- (a) adding acid anhydride or lactone to a ~~first polyfunctional amine~~ monoethanolamine and allowing same to react to form a N- polyfunctional acid common name amide;
- (b) adding to said N- polyfunctional acid common name amide, water + ammonia + ~~Me(OH)~~ alkali metal hydroxide, and allowing same to react to form an N,N- amino polyfunctional acid common name amide, and
- wherein said synthesis occurs in a single vessel, at ambient pressure, and without the addition of heat.
24. (Withdrawn) ~~The compounds synthesized in claim 23 used as fertilizer additives.~~
25. (Withdrawn) ~~The compounds synthesized in claim 23 used as chelating agents in concentrations of  $1/10^a$  to 1 part, where a is less than 10, or  $1.0 \times 10^{-9}$  Molar to 3 Molar.~~
26. (Withdrawn) ~~The compounds in claim 23 used for application to soils, seed, or plants.~~
27. (Currently Twice Amended) The synthesis of compounds comprising at least one poly functional substitution on iminodisuccinic acid having the following formula and the ability to donate at least five nonbonded pairs of electrons without hindrance or bond strain:



where X may be H, alkali, alkaline earth, ammonium-substituted radical, ammonium or transition metal; where n may be 1 to 10; where R may be a lewis base capable of donating a nonbonded pair of electrons; wherein said synthesis comprises the steps of:

- (a) adding an acid anhydride or lactone to a ~~first polyfunctional amine~~ monoethanolamine and allowing same to react to form an N- polyfunctional acid common name amide;
- (b) adding to said N- polyfunctional acid common name amide, water, ammonia + maleic anhydride or maleic acid (salt) and allowing same to react to form said compounds, and

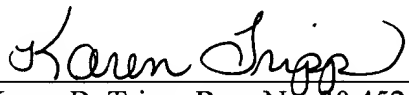
wherein said synthesis occurs in a single vessel, at ambient pressure, and without the addition of heat.

28. (Withdrawn) ~~The compounds synthesized in claim 27 used as fertilizer additives.~~
29. (Withdrawn) ~~The compounds synthesized in claim 27 used as chelating agents in concentrations of 1/10<sup>a</sup> to 1 part, where a is less than 10, or 1.0 x 10<sup>-9</sup> Molar to 3 Molar.~~

30. (Withdrawn) ~~The compounds in claim 27 used for application to soils, seed, or plants.~~
31. (Deleted)
32. (Withdrawn) The iminodisuccinic acid of claim 31 used as a fertilizer additive.
33. (Deleted)
34. (Withdrawn) ~~The iminodisuccinic acid of claim 31 used for application to soils, seed, or plants.~~
35. (Withdrawn) ~~Nonphosphate fertilizer additives comprising Iminodisuccinates.~~

Respectfully submitted,

Date: March 2, 2004

  
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